Wetlands

What is a wetland? In general, a wetland is a transitional area between an upland (dry) area and an aquatic area (a lake, river, etc.), and is subject to temporary or permanent flooding or saturation that changes the character of the vegetation and soils. This is a broad, "lay" definition. Government agencies need a more technical and detailed definition for their day to day work with wetlands. But a single more technical and detailed definition is hard to come by because wetlands vary tremendously in size, shape, hydrologic conditions, and physical, chemical, and biological processes. This huge variability makes it difficult to set down particular attributes that will apply to all situations. Thus, each government agency has developed its own wetland definition based on that agency's management objectives.

Scientific Definitions

Because the U.S. Fish & Wildlife Service deals with wetlands in more of a biological rather than a regulatory capacity, it uses the scientific definition below. There are other scientific definitions of wetlands (e.g., the National Academy of Science, National Research Council: *Wetlands: Characteristics and Boundaries*), but this is the most widely accepted and used scientific definition to date; it is the one recognized by the Indiana Wetlands Conservation Plan:

> Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes:
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> (1) at least periodically, the land supports predominantly hydrophytes;
> (2) the substrate is predominantly undrained hydric soil; and
> (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year. (From Cowardin, 1979. *Classification of Wetlands and Deepwater Habitats of the United States.*)

Regulatory Definitions

The following agencies use the corresponding definitions of wetlands in their regulatory capacities.

State of Indiana Definition (from rules adopted by the Natural Resources Commission to help administer the Indiana Flood Control Act)

> "Wetland" means a transitional area between a terrestrial and deep water habitat (but not necessarily adjacent to a deep water habitat) where at most times the area is either covered by shallow water or the water table is at or near the surface and under normal circumstances any of the following conditions are met:
> (A) The area predominantly supports hydrophytes, at least periodically, or the substrate is predominantly undrained hydric soil; for example, peat or muck.
>
> (B) The substrate is not a soil but is instead saturated with water or covered by shallow water some time during the growing season; for example, marl beaches or sand bars.

Environmental Protection Agency and U.S. Army Corps of Engineers Definition (from Section 404(b)(1) Guidelines under Section 404 of the Clean Water Act (40 CFR Part 230.3(t)))

> The term "wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

U.S. Department of Agriculture Definition (Food Securities Act, Part 12.2)

(a)(29) *Wetlands* are defined as lands that --
- (i) Have a predominance of hydric soil; and
- (ii) Are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and
- (iii) Under normal circumstances do support a prevalence of hydrophytic vegetation.

Functions and Values

Wetlands are important and valuable because of their functions and values. *Functions* and *values* are not synonymous. Functions will continue as long as wetland conditions remain constant, but values will change over time, i.e., new people with differing views moving into communities with wetlands.

> *Functions* are biological, chemical, physical or ecological processes operating within a wetland habitat that may or may not benefit humanity. Functions include: Converting sunlight into organic matter, releasing nitrogen into the atmosphere, removing sediments from water, slow release of stormwater, groundwater recharge, etc. Plants and animals existing in wetland environments are the driving force for these processes. Without healthy plant and animal communities, wetland functions would decline.
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> *Values* are the benefits provided to humans by wetlands or their functions. Values include: Flood control, water quality improvement, timber harvesting, recreational opportunities, aesthetic beauty, etc.

Following are functions and/or values of wetlands, grouped into several broad categories.

Water Resources

Flood Control: During heavy rains, wetlands store massive amounts of water and slow down the flow of surface water. This function reduces the danger of flooding during peak water flow, when potential flood damage is highest. By storing storm water, wetlands dampen the sharp peaks of water runoff into slower discharges over longer periods of time.

Water Quality: Wetlands play a major role in maintaining Indiana's water quality. Wetlands absorb excess inorganic and organic nutrients such as farm fertilizers and septic system runoff, filter sediments such as eroded soil particles, and trap pollutants such as pesticides and some heavy metals. These materials can seriously degrade the quality of water resources, but wetlands trap and hold them, "recycling" some of them within the wetland system.

Wetlands have a great capacity for assimilating treated sewage. Therefore, there is significant interest in the use of created wetlands in wastewater treatment–particularly for animal waste. Early studies by the Purdue Agricultural Research Program and others suggest that constructed wetlands can substantially reduce the impact of animal waste runoff from livestock operations. There also has been interest in constructing wetlands for municipal wastewater treatment, which has been done successfully under certain circumstances. This plan does not advocate the use of natural wetlands for wastewater treatment–this is a role for constructed or restored wetlands.

Groundwater Discharge and Recharge: It is generally accepted that wetlands are sites of groundwater discharge (i.e. where groundwater moves laterally or upward to reach the surface). The reverse is also thought to be true–that wetlands recharge the aquifers and groundwater systems that provide the water many of us get from our faucets. The recharge potential of wetlands is affected by many factors including wetland type, location, season, soils, and precipitation, and appears to be more important in small wetlands than large ones. Nationwide, wetlands are an increasingly important source of ground and surface water near urban centers.

Biological/Ecological

Fisheries: Wetlands support Indiana fisheries by providing habitat and a variety of food sources for fish. Most freshwater fish can be considered wetland-dependent because they use the wetlands for spawning and as nursery grounds.

Wildlife: About 900 species of vertebrate animals require wetlands at some time in their lives. Muskrats and beavers are examples of Indiana mammals that are totally dependent on wetland environments. Wetlands provide the principal habitat for virtually all species of waterfowl nationwide, and also for many other birds, mammals, and reptiles. In Indiana, 11 species of waterfowl use wetlands for nesting, and 28 species use wetlands as migration/wintering habitat.

Nationwide, nearly 35 percent of all rare and endangered animal species depend on wetlands for survival, although wetlands constitute only about 5 percent of the nation's lands. More than 60 wetland-dependent animal species are listed as endangered, threatened, or of special concern in Indiana. Even animals not dependent on wetlands for survival still find them to be excellent habitat. For instance, bottomland hardwood forests support nearly twice as many white-tailed deer per unit area as do upland forests, primarily because of the abundance of food in wetlands.

Plants: Fish and wildlife are not the only living things that require wetlands for survival. A great variety of plants thrive in wetlands as well, and some of the valuable functions and benefits that wetlands provide are due to the plant communities that live there. In addition, because so many wetlands have been lost or degraded, there are more than 120 species of wetland plants in Indiana that are endangered, threatened, or rare.

Erosion Control: Wetland systems help stabilize shorelines and prevent soil erosion. The roots of wetland plants bind the soil, holding it in place, while the above-ground portions of these plants absorb wave energy, slowing the water's flow. Wetlands also trap sediments suspended in moving water. Wetlands with emergent plants (such as cattails) can remove up to 95% of the sediments from flood waters.

In northern Indiana, many natural lakes have experienced serious shoreline erosion due to the wake wash from the growing number of boats and other pleasure craft. Wetlands fringing these lakes shield the shorelines from wave action, providing important erosion control that protects lakefront properties.

Economic

Food Production: Wetlands provide habitat for fish, waterfowl, shellfish, and other animals that are harvested for food. Healthy and functioning wetland ecosystems are necessary to maintain the resource base for this food production economy. Because of their high productivity, wetlands also have unrealized food production potential through the harvest of vegetation and aquaculture.

Wood Production: Forested wetlands often contain high-value tree species, and under proper management, are an important source of timber and other forest products. In Indiana, more than half of the remaining wetland acres are forested. Indiana ranks third nationally in hardwood lumber production, contributing $5 billion annually to the state's economy.

Trapping: Although it is not a major economic activity in Indiana, the harvest of fur-bearing animals does generate revenue for trappers. All of the economically significant furbearer species in Indiana are wetland-related.

Recreation: Many recreational activities take place in or around wetlands, including hunting, fishing, sightseeing, nature study, photography, bird-watching, canoeing, and boating. Some of these activities are directly dependent upon wetlands. Nationwide, over $10 billion is spent annually by an estimated 50 million people on fishing, hunting, boating, nature study, photography, and swimming. In Indiana, duck and goose hunting alone provide approximately 75,000 user days of recreation annually, and a survey by the U.S. Fish and Wildlife Service suggests that Indiana wetland habitats generate more than a million user days of nonconsumptive recreation each year.

Other: Economic benefits of flood control, drought mitigation, groundwater recharge, water quality, public and private water supply, and soil conservation are large. For example, wetlands help prevent costly flood and drought damage. In addition, water taken for public water supplies requires less expensive treatment if the water has been filtered by wetlands.

Intangible Benefits/Existence Value

In addition to physical, ecological, and economic values, wetlands also provide other, less tangible benefits that may be referred to as *existence* values.

Ethical: Many people feel a strong sense of stewardship for the natural world--that regardless of economic value, all forms of life deserve respect. Many also believe that humans have a moral responsibility to maintain natural ecosystems for ourselves and for future generations.

Future Options: Human understanding of the many values of the natural world is incomplete. Healthy wetland ecosystems may contain a treasure trove of as yet undiscovered benefits for agriculture, industry, medicine, and recreation. The best option for preserving this potential is to maintain the biodiversity present in healthy wetland ecosystems.

Wetland Regulations and Wetland Conservation

Wetland regulations allow us to maintain a balance between the destruction of wetlands (by development or other uses of the land) and the protection of wetlands. There are legitimate reasons to destroy or alter wetlands, but we must not destroy or alter them *all*. Thus, we have programs that are intended to regulate activities affecting the nation's waters and wet areas. Various government agencies play different roles in carrying out these programs.

Federal

There are many federal programs that directly or indirectly protect wetlands, such as the Wetlands Reserve Program and the Endangered Species Act. But the major wetland regulatory programs administered by federal agencies are described below.

Clean Water Act, Section 404, Permit Program (ACOE and EPA)

The Army Corps of Engineers (Corps) and the Environmental Protection Agency (EPA) have joint responsibility for the Permit Program, but the Corps is the lead agency. After giving notice and opportunity for a public hearing, the Corps is authorized to issue permits for the discharge of dredged or fill material into "waters of the United States" (which includes wetlands), if the proposed activity complies with EPA guidelines. The EPA reviews and comments on permit applications being evaluated by the Corps (the EPA can veto the Corps' decision to issue a permit). The two agencies share enforcement authority over unauthorized activity.

Clean Water Act, Section 401, Water Quality Certification (IDEM)

The Indiana Department of Environmental Management (IDEM) has the authority to review federal permits that may result in materials being discharged into waters under state jurisdiction, so that the actions will be consistent with Indiana's water quality standards. IDEM can qualify certifications by specifying conditions that must be met, and if IDEM denies certification, the federal permit cannot be issued.

Wetland Conservation (Swampbuster) Provision (NRCS)

The Natural Resources Conservation Service's (NRCS) Swampbuster program discourages the conversion of wetlands on agricultural lands by denying federal farm benefits to farmers who drain wetlands. Conversions can be allowed if they will only cause minimal effects. The NRCS and the U.S. Fish & Wildlife Service jointly determine whether the conversion will constitute a minimal effect, but the NRCS has the final say.

Wetlands Reserve Program (NRCS)
Although not a regulatory program, the Wetlands Reserve Program (WRP) is an important federal program administered by the Natural Resources Conservation Service. The WRP is a voluntary program by which landowners can receive payments for restoring and protecting wetlands on their property. Certain uses of the land that are allowed are spelled out in a plan that is developed for the area. Uses or activities that would diminish the functions and values of the wetland(s) are not allowed.

State

Indiana Flood Control Act (IDNR)
In the Flood Control Act's preamble, the General Assembly declared that "... the loss of lives and property caused by floods and the damage resulting from floods is a matter of deep concern to Indiana affecting the life, health, and convenience of the people and the protection of property." Furthermore, "... the channels and that part of the flood plains of rivers and streams that are the floodways should not be inhabited and should be kept free and clear of interference or obstructions that will cause any undue restriction of the capacity of the floodways." The Assembly created a permitting program within the Act to ensure that "... all flood control works and structures and the alteration of natural or present watercourses of all rivers and streams in Indiana ... be regulated ... according to sound and accepted engineering practices so as to best control and minimize the extent ... and reduce the height and violence of floods ..."

Indiana Lake Preservation Act (IDNR)
The Lakes Preservation Act states that the natural resources and natural scenic beauty of Indiana's public freshwater lakes are a public right. It further states that the general public "has a vested right in the ... preservation, protection, and enjoyment of all public freshwater lakes ... in their present state" and in the "... use of the public freshwater lakes for recreational purposes." To ensure that these rights are preserved, the Act provides the State with "... full power and control of all of the public freshwater lakes" and mandates that the State hold and control "... all public freshwater lakes in trust for the use of all citizens of Indiana." The Legislature created a permitting program within the Lakes Preservation Act to provide the State with the authority to fulfill its statutory obligation. Section 6 of the Act details this program by stating that "a person may not change the level of the water or the shoreline of a public freshwater lake by ... excavating; filling in; or otherwise causing a change in the area or depth of; or affecting the natural resources, scenic beauty, or contour of; the lake below the waterline or shoreline without a written permit issued by the Department." Simply stated, any activity which occurs at or lakeward of a public freshwater lake's legal or average normal shoreline requires the written authorization of the Department prior to project initiation.

Lowering of Ten Acre Lakes Act
The Lowering of Ten Acre Lakes Act states that a person may not "... locate, make, dig, dredge, construct, reconstruct, repair, or reclean ... a ditch or drain having a bottom depth lower than the normal water level of a lake within one-half (1/2) mile of the lake without a permit from the department." Additionally, it restricts a person's ability to "... order or recommend the location, establishment, construction, reconstruction, repair, or recleaning" of a ditch and/or drain under the same conditions. The Act's regulatory program was established to provide safeguards against

the lowering of a freshwater lake's water level as the result of a ditch and/or drain activity. Although it may seem excessive to extend the area of regulatory control up to 1/2 mile landward of the shoreline, many of the lakes in northern Indiana are underlain by, and connected to, sand and/or gravel lenses. The penetration of a lens while performing work on a ditch and/or drain could result in a lowering of the lake's level and related environmental damage. To safeguard against this potential, the Legislature mandated that all ditch and/or drain work meeting the Act's criteria be regulated by the Department.

Indiana Navigable Waterways Act (IDNR)

The General Assembly charged the Department of Natural Resources with oversight of the State's navigable waters by stating "... the Department shall ... have general charge of the navigable water of Indiana." To carry out this regulatory responsibility, the Assembly created several permitting programs, including Section 8 of the Navigable Waterways Act. This provision requires that a person obtain a permit from the Department prior to initiating certain activities within a navigable waterway.

Indiana Water Quality Standards (IDEM)

The Indiana Department of Environmental Management (IDEM) is responsible for establishing specific water quality standards for Indiana's wetlands, and procedures for reviewing federally permitted or licensed activities that require certification under Section 401 of the federal Clean Water Act. Such activities include those regulated by the U.S. Corps of Engineers under Section 404 of the Clean Water Act and by the Federal Energy Regulatory Commission, such as licenses for hydroelectric facilities. In determining whether to issue a certification, the state is required to review the proposed activity and determine whether the activity will meet certain federal and state requirements including state water quality standards. The certification must contain conditions necessary to ensure compliance with applicable laws.

Private/Local

City Councils

City councils can develop wetland conservation ordinances that will help to protect valuable community wetlands from development. The City of Auburn Department of Building, Planning & Economic Development (219-925-6449) has developed such an ordinance. A *Model Wetlands Ordinance for Indiana Communities* can be viewed at the website, www.home.switchboard.com/indianawetlands.